

"On the reabsorption of the Mixed Gases in a Voltameter." By Professor M. H. Jacobi, in a letter to Michael Faraday, Esq., F.R.S. Communicated by Dr. Faraday.

The author found that if the mixed gases developed from the decomposition of water by a voltaic current, be allowed to remain in the voltameter in which they were collected, in contact with the fluid which produced them, they by degrees diminish in volume, and ultimately disappear by being absorbed by the fluid. He has not yet fully determined the precise conditions on which this phenomenon depends; but he is inclined to think that it is owing to a portion of the mixed gases, diffused throughout the whole liquid, coming into contact with the platinum plates, and being recombined on the surface of those plates; and this process being renewed with every fresh portion of the gases which takes the place of the former, the whole of the gases are thus reconverted into water.

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March 4, 1847.

The MARQUIS OF NORTHAMPTON, President, in the Chair.

Charles Brooke, Esq. was elected a Fellow of the Society.

"Researches into the effects of certain Physical and Chemical Agents on the Nervous System." By Marshall Hall, M.D., F.R.S., &c.

The professed object of the author, in the present paper, is "to detail the results of an investigation of the phenomena and the laws of production and action of certain secondary or induced conditions of the nervous system, which are effected by a voltaic, and probably by any other electric current, but persistent after the influence of that current is withdrawn." This condition he designates by the new term *electrogenic*, as describing at once the origin and the independence of that condition. On the present occasion he confines himself to the subject of the electrogenic condition of the muscular nerves, postponing to future inquiries that of the incident nerves and of the spinal marrow; and also the modes of action of other physical and chemical agents, such as mechanical injury, heat and cold, strychnine, and the hydrocyanic acid.

The bones and muscles of the brachial lumbar and pelvic regions of a frog, being isolated from all the other parts of the body, excepting only by means of their respective brachial and lumbar nerves, which were perfectly denuded on all sides, and raised from the glass on which the limbs were laid, a voltaic current from a pair of the "couronne de tasses" was passed downwards through the nerves, in a direction from their origin in the spinal marrow towards their terminations in the muscles. Energetic muscular movements were at first excited; and the current was thus continued during the space of five, ten, or fifteen minutes, and at the end of this period was

withdrawn. No sooner was the current discontinued than the muscles were affected with spasmodic contractions, and with a tetanoid rigidity, constituting the secondary, or what the author denominates the *electrogenic condition*; an effect, which as instantly subsides on the restoration of the voltaic current.

The author proceeds to state the precautions which must be taken to ensure the success of experiments on this subject; and traces the effects of desiccation of the nerves from spontaneous evaporation, and of the application of external moisture, on the phenomena; and also the modifications introduced by varying the extent of voltaic contact. Various experiments are then described, which the author instituted with a view to ascertain the nature of the electrogenic condition of the nerves, and the circumstances under which it is induced; and he is led to the conclusion that the phenomena involve some voltaic principle which has not hitherto been fully investigated.

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March 11, 1847.

The MARQUIS OF NORTHAMPTON, President, in the Chair.

“On the cause of the discrepancies observed by Mr. Baily with the Cavendish Apparatus for determining the Mean Density of the Earth.” By George Whitehurst Hearn, Esq., of the Royal Military College, Sandhurst. Communicated by Sir John F. W. Herschel, Bart., F.R.S.

After taking a summary review of the methods employed by Mr. Baily for determining, on the plan devised by Mr. Cavendish, the mean density of the earth, and of the anomalies, hitherto unaccounted for, which had introduced perplexity in the results obtained, the author, suspecting that these anomalies had their source in the variable magnetic states of the masses which were the subject of experiment, traces the effects which such an influence might be supposed to have on those results. He finds that, the attraction arising from gravitation between a mass and one of the balls being exceedingly minute, an almost inconceivably feeble magnetic state may be the cause of great perturbations. He then proceeds to investigate the subject by the application of mathematical analysis; from which he is led to the conclusion that the masses and balls do actually exert on one another influences which are independent of the action of gravitation. He finds that such influences are of a very fluctuating nature; the action arising from them being either positive or negative, and its sign also changing in each revolution as the masses are turned round a vertical axis; and he observes that such action may either fall short of that arising from gravitation or exceed it many times. Such disturbing force he conceives can be no other than a magnetic influence; not however one of the ordinary kind, but that which Faraday has recently discovered as affecting all diamagnetic bodies.